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429 Changing Patterns of Groups at High Risk for Hepatitis B in the United States
437 Childhood Chloroquine Poisonings: Wisconsin and Washington
439 Announcement of the Third National Conference on Chronic Disease Prevention and Control

Current Trends

Changing Patterns of Groups at High Risk for Hepatitis B in the United States

Since 1982, CDC has been conducting intensive surveillance in collaboration with four sentinel counties (Denver County, Colorado; Jefferson County, Alabama; Pierce County, Washington; and Pinellas County, Florida) to determine trends in the epidemiology of acute viral hepatitis in the United States. Patients reported to these county health departments are considered to have acute viral hepatitis if they meet the following clinical criteria: presence of symptoms or signs of viral hepatitis; presence of serum aminotransferase levels higher than 2.5 times the upper limit of normal; and absence of other causes of liver injury. All cases are then classified as to the specific type of viral hepatitis on the basis of the following serologic criteria:

1. hepatitis A (HA)—patient is positive for IgM antibody to hepatitis A virus (IgM anti-HAV).
2. hepatitis B (HB)—patient is positive for hepatitis B surface antigen (HBsAg) and/or for IgM antibody to hepatitis B core antigen (IgM anti-HBc).
3. non-A, non-B (NANB) hepatitis—patient is negative for IgM anti-HAV and negative for HBsAg and/or IgM anti-HBc.

Each patient with viral hepatitis is extensively interviewed for risk factors associated with acquiring the disease. In addition, to determine the actual source of infection for HB patients who have no identifiable source, attempts are made to obtain serum from household and sexual contacts of these patients.

From 1982 to 1985, both the overall incidence and the disease transmission patterns of HB were relatively constant (Figure 1, Table 1). During that time, three major risk factors accounted for almost half of disease transmission: male homosexual activity was reported by an average of 21% of patients; intravenous (IV) drug abuse, by an average of 15%; and heterosexual exposure (sexual contact with a known HB patient, with an HB virus [HBV] carrier, or with multiple partners) was reported by an average of 18%. Other recognized risk factors included health-care employment with frequent blood contact (5%), household contact with a known HB

Hepatitis B — Continued

patient or carrier (2%), blood transfusions (2%), dialysis (1%), and residency in an institution for the developmentally disabled (1%). No cases of HB resulting from perinatal transmission were identified in these four counties. For an average of 36% of cases, no source of infection was identified.

Since 1985, although the overall incidence of disease remained stable, IV drug abuse, reported by 27% of patients, replaced homosexual activity as the major risk factor for HBV infection. The proportion of patients whose risk factor for HB was heterosexual exposure (as defined above) also increased to 24%; in contrast, the percentage of patients reporting male homosexual activity declined to 9%, and that of patients reporting health-care employment with frequent blood contact declined to an average of 1%. The percentage of patients reporting no identifiable source of infection also declined slightly, while the percentage reporting household contact, transfusions, dialysis, and institutionalization did not change from previous years. The increase in cases of HB associated with IV drug abuse occurred in three (Denver, Jefferson, Pierce) of the four counties; however, it was most striking in Pierce County and accounted for the county's sharp increase in disease incidence.

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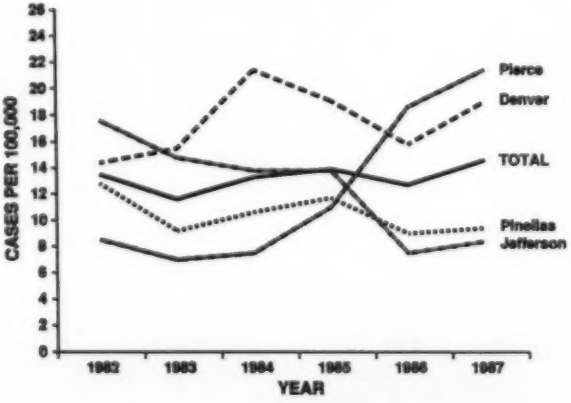
Editorial Note: The recent changes in the percentage of HB cases attributable to specific groups at high risk for infection are striking. The 57% decrease in the number of HB cases among homosexual men is most likely a result of modification of high-risk sexual behavior to prevent human immunodeficiency virus (HIV) infection (*1*). This hypothesis is supported by evidence that the incidence of new HIV

FIGURE 1. Reported incidence of hepatitis B virus in four sentinel counties, 1982–1987



Hepatitis B — Continued

infection is declining among certain cohorts of homosexual men (*2*) and that other sexually transmitted diseases among this group also appear to be on the decline in some areas (*3*). In contrast, the number of cases of HB due to heterosexual exposure increased modestly and parallels the recent increases in cases of primary and secondary syphilis that also occurred primarily among heterosexuals (*3*). Of more concern is the 80% increase in the proportion of HB patients with a history of IV drug abuse. Because the overall incidence rate of HB has remained relatively constant during this period, the absolute number of HB cases related to drug abuse appears to be increasing, indicating no modification of this high-risk behavior. Although most of the overall increase in IV drug abuse-associated HB found in this study was attributable to one county, similar increases nationwide have been seen in cases of HA, HB, and NANB hepatitis as reported to the National Viral Hepatitis Surveillance Program. These concurrent increases suggest that hepatitis associated with IV drug abuse is a widespread problem (*4,5*; CDC, unpublished data).

It is not surprising that in a sample of this size no perinatal cases of HB were reported. HBV infection in neonates usually results in subclinical infection.

Nationwide, the incidence of HB has increased steadily over the last decade in spite of the availability of a vaccine since 1982 (*4*). Vaccination programs and vaccine usage have focused primarily on three risk groups—health-care workers who are exposed to blood; staff and residents of institutions for the developmentally disabled; and staff and patients in hemodialysis units (*6*). These groups, however, account for only 5%–10% of acute HB cases. The risk groups that account for most cases—IV drug abusers, persons acquiring disease through heterosexual exposure, and homosexual men—are not being reached effectively by current HB vaccine programs.

The ability to immunize those groups at highest risk of HBV infection is severely limited for several reasons: the failure of both health-care providers and the target populations to recognize the specific groups at high risk of infection; difficulty in

TABLE 1. Risk factors associated with reported cases of hepatitis B — four sentinel counties, 1982–1987

	Percentage of Cases					
Risk Factor*	1982 (n=326)†	1983 (n=230)†	1984 (n=256)†	1985 (n=283)†	1986 (n=250)†	1987 (n=295)†
Homosexual Activity	20	20	24	20	9	9
Intravenous Drug Abuse	15	13	14	16	26	28
Heterosexual Activity§	15	20	20	19	26	22
Health-Care Employment with Frequent Blood Contact	3	6	4	3	1	2
Household Contact	<1	3	2	3	3	3
Blood Transfusion	4	2	1	3	3	2
Dialysis	<1	1	<1	<1	0	<1
Resident of Institution for Developmentally Disabled	1	2	0	0	<1	1
No Known Source	42	33	34	36	32	32

*Within 6 months before onset of symptoms.
†n = number of patients interviewed (80%–90% of cases reported).
§Includes sexual contact with an HB patient, with an HBV carrier, or with multiple partners.

Hepatitis B — Continued

identifying persons with these high-risk behaviors; and difficulties in reaching these groups for delivery of vaccine and in timing of vaccination. In 1985, CDC surveyed a random sample of physicians in two cities to determine patterns of use and delivery of HB vaccine. Only one-third had given HB vaccine to anyone in the previous 6 months. When physicians were asked why HB vaccine was not routinely recommended, 55% said they did not see patients at high risk. When asked to specify the groups at high risk for HBV infection, 70% identified IV drug abusers, only 45% identified homosexual men, and very few (10%) identified heterosexuals with multiple partners or heterosexual contacts of carriers (12%). Thus, many potential vaccine providers have inadequate knowledge about who should receive vaccine (CDC unpublished data). Further, it is unknown whether medical-care providers who are aware of the groups at high risk of infection routinely obtain a history that would identify high-risk behaviors.

(Continued on page 437)

TABLE I. Summary — cases of specified notifiable diseases, United States

Disease	28th Week Ending			Cumulative, 28th Week Ending		
	Jul. 16, 1988	Jul. 18, 1987	Median 1983-1987	Jul. 16, 1988	Jul. 18, 1987	Median 1983-1987
Acquired Immunodeficiency Syndrome (AIDS)	936	U *	202	16,852	10,009	3,946
Aseptic meningitis	107	319	240	2,358	3,402	2,923
Encephalitis: Primary (arthropod-borne & unspec)	9	26	28	366	503	503
Post-infectious	5	3	3	64	68	68
Gonorrhea: Civilian	12,821	14,599	16,221	358,813	420,662	454,635
Military	340	314	346	6,609	8,790	11,161
Hepatitis: Type A	370	478	363	12,878	13,322	11,412
Type B	413	545	499	11,618	13,774	13,358
Non A, Non B	33	60	64	1,359	1,715	1,912
Unspecified	37	52	70	1,144	1,882	2,555
Legionellosis	17	16	15	454	483	366
Leprosy	4	1	8	94	101	139
Malaria	24	27	27	393	413	452
Measles: Total†	43	83	86	1,647	2,868	2,025
Indigenous	40	80	84	1,480	2,557	1,788
Imported	3	3	3	167	311	230
Meningococcal infections	39	56	43	1,813	1,826	1,745
Mumps	60	150	25	3,070	9,652	2,147
Pertussis	32	40	46	1,110	961	1,065
Rubella (German measles)	8	12	12	128	240	398
Syphilis (Primary & Secondary): Civilian	456	768	520	20,036	18,186	14,788
Military	1	1	2	91	88	107
Toxic Shock syndrome	5	6	8	162	167	214
Tuberculosis	376	480	412	10,583	11,102	11,201
Tularemia	6	10	9	91	92	92
Typhoid Fever	11	4	5	189	155	167
Typhus fever, tick-borne (RMSF)	43	37	30	283	286	297
Rabies, animal	75	72	78	2,255	2,696	2,760

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1988		Cum. 1988
Anthrax	-	Leptospirosis (Hawaii 1, Calif. 1)	17
Botulism: Foodborne	11	Plague	2
Infant	21	Poliomyelitis, Paralytic	-
Other	3	Psittacosis	41
Brucellosis (Tex. 1, Mass. 1)	34	Rabies, human	-
Cholera	-	Tetanus (Calif. 1, Va. 1)	23
Congenital rubella syndrome	3	Trichinosis	38
Congenital syphilis, ages <1 year	171		
Diphtheria	-		

*Because AIDS cases are not received weekly from all reporting areas, comparison of weekly figures may be misleading.
†Three of the 43 reported cases for this week were imported from a foreign country or can be directly traceable to a known internationally imported case within two generations.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending July 16, 1988 and July 18, 1987 (28th Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionellosis	Leprosy
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1987	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988
UNITED STATES	16,862	2,358	366	64	358,813	420,662	12,878	11,618	1,359	1,144	454	94
NEW ENGLAND	711	102	12	1	10,741	13,088	470	708	85	68	18	11
Maine	23	7	1	-	221	382	14	29	3	1	2	-
N.H.	17	13	1	-	137	213	30	35	5	3	1	-
Vt.	8	5	3	-	77	111	5	19	5	2	1	-
Mass.	397	42	6	1	3,673	4,756	220	444	57	50	11	10
R.I.	37	28	-	-	993	1,106	55	61	9	-	3	1
Conn.	229	7	1	-	5,640	6,518	146	120	6	12	-	-
MID. ATLANTIC	5,565	219	38	4	54,178	69,044	790	1,519	83	130	114	8
Upstate N.Y.	757	124	26	1	7,452	8,967	430	399	38	13	50	-
N.Y. City	2,966	48	7	3	22,953	36,859	170	700	9	91	17	7
N.J.	1,334	47	5	-	7,856	8,668	129	347	27	26	20	1
Pa.	508	-	-	-	16,017	14,550	61	73	9	-	27	-
E.N. CENTRAL	1,238	314	92	7	58,193	60,959	952	1,270	117	61	100	1
Ohio	276	106	28	2	13,248	13,419	189	308	18	10	42	-
Ind.	80	38	11	-	4,489	4,824	77	190	11	15	8	-
Ill.	552	49	19	5	16,188	18,829	240	233	43	13	-	-
Mich.	261	106	23	-	18,033	18,309	206	407	27	20	40	-
Wis.	69	15	11	-	4,237	5,578	140	142	18	3	10	1
W.N. CENTRAL	410	102	25	5	14,572	17,030	765	558	65	19	52	1
Minn.	88	19	2	2	1,987	2,854	58	80	11	3	2	-
Iowa	21	19	8	-	1,091	1,635	33	50	11	1	13	-
Mo.	211	33	1	-	8,233	8,797	432	331	30	9	10	-
N. Dak.	2	-	4	-	84	159	3	3	2	4	1	-
S. Dak.	5	9	1	1	288	310	6	3	2	-	14	-
Nebr.	25	3	4	2	860	1,101	29	32	-	-	5	-
Kans.	58	19	5	-	2,029	2,374	204	59	9	2	7	1
S. ATLANTIC	2,838	561	49	25	106,000	110,507	1,088	2,382	204	165	81	1
Del.	30	11	2	-	1,502	1,685	20	70	6	1	7	-
Md.	327	62	4	3	10,415	12,547	147	374	20	10	11	1
D.C.	275	11	-	1	7,524	7,411	11	27	3	1	-	-
Va.	182	57	19	3	7,132	8,055	225	168	47	107	6	-
W. Va.	8	10	2	-	743	804	8	31	2	3	-	-
N.C.	154	73	14	-	16,593	16,528	181	417	44	-	25	-
S.C.	79	10	-	1	9,179	9,161	28	306	8	3	12	-
Ga.	432	70	1	-	20,220	18,947	203	369	8	3	11	-
Fla.	1,351	257	7	17	32,692	35,369	265	620	66	37	9	-
E.S. CENTRAL	404	173	29	6	27,851	31,266	390	705	92	6	18	1
Ky.	50	52	10	1	2,684	3,153	333	123	36	2	8	-
Tenn.	177	14	6	-	9,320	10,996	34	349	25	-	6	-
Ala.	108	86	13	2	8,857	9,972	8	183	25	4	2	1
Miss.	69	21	-	3	6,990	7,147	15	50	6	-	2	-
W.S. CENTRAL	1,415	273	37	2	40,362	47,272	1,446	949	105	283	11	19
Ark.	49	5	2	-	3,895	4,927	172	56	1	8	2	-
La.	205	48	12	-	8,329	8,663	76	189	16	9	4	1
Okla.	68	21	4	-	3,675	5,210	251	96	24	19	5	-
Tex.	1,093	199	19	2	24,463	28,472	947	608	64	247	-	18
MOUNTAIN	551	92	19	2	7,811	11,049	1,837	913	147	97	25	1
Mont.	9	2	-	-	239	290	23	32	8	3	-	-
Idaho	6	1	-	-	212	404	90	60	4	3	-	-
Wyo.	3	1	-	-	129	255	4	8	3	-	2	-
Colo.	210	34	3	-	1,795	2,384	123	116	42	48	5	1
N. Mex.	26	5	2	-	723	1,205	351	137	11	1	1	-
Ariz.	169	27	5	1	2,751	3,814	916	350	44	27	12	-
Utah	42	13	4	1	312	339	208	84	26	13	2	-
Nev.	87	9	5	-	1,650	2,358	122	126	9	4	3	-
PACIFIC	3,720	522	65	12	41,105	60,445	5,240	2,614	461	315	35	51
Wash.	234	-	3	4	3,362	4,582	1,140	395	57	30	10	3
Oreg.	95	-	-	-	1,680	2,260	811	325	47	13	-	1
Calif.	3,326	460	59	8	35,100	52,202	3,112	1,831	322	264	22	39
Alaska	13	11	2	-	603	911	171	34	4	4	-	1
Hawaii	52	51	1	-	360	490	6	29	1	4	3	7
Guam	1	-	-	-	86	116	5	7	-	2	1	3
P.R.	769	23	2	1	778	1,173	25	152	25	27	-	3
V.I.	24	-	-	-	218	139	1	5	2	-	-	-
Amer. Samoa	-	-	-	-	45	45	-	2	-	4	-	2
C.N.M.I.	-	-	-	-	27	-	1	2	-	4	-	-

N: Not notifiable U: Unavailable C.N.M.I.: Commonwealth of the Northern Mariana Islands

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending July 16, 1988 and July 18, 1987 (28th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1988	1988	Cum. 1988	1988	Cum. 1988	Cum. 1987	Cum. 1988	1988	Cum. 1988	1988	Cum. 1988	Cum. 1987	1988	Cum. 1988	Cum. 1987
UNITED STATES	393	40	1,480	3	167	2,868	1,813	60	3,070	32	1,110	961	8	128	240
NEW ENGLAND	35	-	80	-	48	249	149	-	98	1	90	27	-	1	1
Maine	2	-	7	-	-	3	7	-	-	-	11	5	-	-	1
N.H.	1	-	66	-	44	151	17	-	94	-	29	4	-	-	-
Vt.	2	-	-	-	-	25	9	-	1	-	2	3	-	-	-
Mass.	18	-	1	-	-	48	64	-	3	1	37	6	-	-	-
R.I.	4	-	-	-	-	2	21	-	-	-	2	1	-	1	-
Conn.	8	-	6	-	4	20	31	-	-	-	9	8	-	-	-
MID. ATLANTIC	52	17	522	1	25	513	174	12	264	4	59	115	-	11	10
Upstate N.Y.	19	-	14	-	3	33	84	2	69	4	38	86	-	2	8
N.Y. City	24	3	39	1†	2	420	44	10	92	-	1	-	-	6	1
N.J.	5	-	2	-	11	22	45	-	31	-	4	6	-	1	1
Pa.	4	14	467	-	9	38	1	-	72	-	16	23	-	2	-
E.N. CENTRAL	24	10	129	-	40	286	242	3	646	4	114	128	-	22	29
Ohio	3	-	2	-	21	5	82	-	96	-	25	35	-	-	-
Ind.	2	6	58	-	-	-	21	-	63	2	55	4	-	-	-
Ill.	1	-	53	-	15	117	60	-	236	-	2	12	-	18	20
Mich.	16	4	18	-	4	29	55	3	170	2	21	28	-	4	9
Wis.	2	-	-	-	-	137	34	-	81	-	11	49	-	-	-
W.N. CENTRAL	10	-	11	-	-	216	70	-	115	-	64	58	-	-	1
Minn.	4	-	10	-	-	34	16	-	-	-	17	9	-	-	-
Iowa	1	-	-	-	-	-	-	-	31	-	16	10	-	-	1
Mo.	3	-	1	-	-	180	24	-	30	-	9	18	-	-	-
N. Dak.	-	-	-	-	-	1	-	-	-	-	6	5	-	-	-
S. Dak.	-	-	-	-	-	-	3	-	-	-	2	2	-	-	-
Nebr.	1	-	-	-	-	-	9	-	11	-	-	1	-	-	-
Kans.	1	-	-	-	-	1	18	-	43	-	4	11	-	-	-
S. ATLANTIC	55	3	254	-	12	100	322	8	472	7	134	178	1	15	13
Del.	-	-	-	-	-	30	1	-	-	-	3	-	-	-	2
Md.	4	1	6	-	2	4	33	-	79	4	26	5	-	-	2
D.C.	7	-	-	-	-	1	7	4	169	-	-	-	-	-	-
Va.	9	2	154	-	2	1	37	2	132	-	27	38	-	11	1
W. Va.	-	-	6	-	-	-	2	-	8	-	3	28	-	-	-
N.C.	10	-	-	-	1	3	55	-	35	-	33	74	-	-	1
S.C.	6	-	-	-	-	-	33	-	4	1	1	-	-	-	-
Ga.	4	-	-	-	-	1	47	2	25	1	20	17	1	1	1
Fla.	15	-	88	-	7	60	107	-	20	1	21	16	-	3	6
E.S. CENTRAL	7	-	45	-	-	2	172	1	368	3	23	22	-	-	3
Ky.	-	-	32	-	-	-	35	-	170	-	-	1	-	-	2
Tenn.	-	-	-	-	-	-	101	-	186	-	12	6	-	-	1
Ala.	4	-	-	-	-	-	25	1	9	3	10	10	-	-	-
Miss.	3	-	13	-	-	2	11	N	N	-	1	5	-	-	-
W.S. CENTRAL	40	-	11	-	4	299	120	31	602	4	72	72	-	7	5
Ark.	1	-	-	-	2	-	16	-	78	-	7	6	-	3	2
La.	8	-	-	-	-	-	37	18	226	1	11	17	-	-	-
Okla.	7	-	8	-	-	2	13	9	163	3	27	48	-	1	-
Tex.	24	-	3	-	2	297	54	4	135	-	27	-	-	3	3
MOUNTAIN	19	-	116	1	4	467	53	-	148	2	341	95	-	5	19
Mont.	2	-	-	1†	2	116	2	-	2	-	1	3	-	-	3
Idaho	-	-	-	-	1	-	5	-	2	-	249	33	-	-	1
Wyo.	-	-	-	-	-	2	-	-	2	-	1	5	-	-	1
Colo.	9	-	116	-	1	5	14	-	28	-	13	23	-	1	-
N. Mex.	1	-	-	-	-	315	10	N	N	-	7	7	-	-	-
Ariz.	4	-	-	-	-	25	12	-	100	2	50	23	-	-	4
Utah	2	-	-	-	-	1	9	-	3	-	20	1	-	3	10
Nev.	1	-	-	-	-	3	1	-	11	-	1	-	-	1	-
PACIFIC	151	10	312	1	34	734	511	5	357	7	223	288	7	67	159
Wash.	9	-	2	-	-	32	45	-	16	2	47	40	-	-	-
Oreg.	9	-	3	-	-	35	27	N	N	-	9	14	-	-	1
Calif.	127	10	305	-	29	653	420	4	314	1	117	109	2	50	100
Alaska	2	-	-	-	-	-	5	1	7	-	5	3	-	-	1
Hawaii	4	-	2	1†	5	4	14	-	9	4	45	102	5	17	57
Guam	-	-	-	-	1	2	-	-	2	-	-	-	-	1	1
P.R.	1	-	190	-	-	645	8	-	6	1	9	12	-	1	2
V.I.	-	-	-	-	-	-	-	-	14	-	-	-	-	-	-
Amer. Samoa	-	-	-	-	-	-	2	-	3	-	-	-	-	-	-
C.N.M.I.	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-

*For measles only, imported cases includes both out-of-state and international importations.
N: Not notifiable U: Unavailable †International §Out-of-state

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending July 16, 1988 and July 18, 1987 (28th Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1988	Cum. 1987	Cum. 1988	Cum. 1988	Cum. 1987	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988
UNITED STATES	20,036	18,186	162	10,583	11,102	91	189	263	2,255
NEW ENGLAND	569	301	13	259	349	2	16	8	4
Maine	8	1	3	17	17	-	-	-	1
N.H.	6	3	3	6	8	-	-	-	2
Vt.	2	1	2	2	7	-	1	-	-
Mass.	220	150	5	149	196	1	11	3	-
R.I.	17	8	-	24	25	-	-	2	-
Conn.	316	138	-	61	96	1	4	3	1
MID. ATLANTIC	3,951	3,464	26	1,910	1,882	-	34	11	273
Upstate N.Y.	272	106	11	280	283	-	5	4	12
N.Y. City	2,486	2,515	5	913	889	-	18	5	-
N.J.	459	373	3	345	346	-	11	-	2
Pa.	735	470	7	372	344	-	-	2	259
E.N. CENTRAL	588	490	24	1,215	1,296	1	22	27	76
Ohio	61	56	19	233	249	-	5	22	2
Ind.	34	33	-	124	130	-	2	-	17
Ill.	281	267	-	494	541	-	10	2	15
Mich.	194	95	5	307	316	1	4	2	17
Wis.	18	39	-	57	60	-	1	1	25
W.N. CENTRAL	121	80	21	265	342	46	4	39	272
Minn.	9	10	3	44	73	3	2	-	84
Iowa	14	11	4	22	19	-	-	-	13
Mo.	72	40	7	128	190	30	2	24	8
N. Dak.	1	-	2	5	6	-	-	-	54
S. Dak.	-	8	1	21	17	10	-	5	83
Nebr.	19	7	2	9	12	2	-	-	9
Kans.	6	4	2	36	25	1	-	10	21
S. ATLANTIC	7,336	6,292	14	2,308	2,402	4	20	78	756
Del.	65	45	1	19	24	1	-	-	34
Md.	398	317	2	226	208	-	1	10	187
D.C.	348	188	-	96	78	-	1	-	4
Va.	229	160	-	219	240	2	8	7	217
W. Va.	7	6	-	44	64	-	-	1	59
N.C.	409	336	6	205	260	-	1	37	1
S.C.	410	403	2	261	231	-	-	12	48
Ga.	1,196	858	-	372	401	1	2	9	147
Fla.	4,274	3,981	3	866	896	-	7	2	59
E.S. CENTRAL	1,041	1,031	13	892	940	6	3	35	168
Ky.	36	8	6	222	240	4	1	9	68
Tenn.	446	435	4	255	264	1	-	20	55
Ala.	302	261	3	271	272	-	1	4	45
Miss.	257	327	-	144	164	1	1	2	-
W.S. CENTRAL	2,279	2,269	15	1,382	1,299	22	6	56	308
Ark.	123	128	1	148	157	14	-	7	53
La.	442	395	-	180	144	-	2	-	2
Okla.	83	85	4	130	124	8	-	40	23
Tex.	1,631	1,661	10	924	874	-	4	9	230
MOUNTAIN	379	361	19	248	316	6	6	7	187
Mont.	2	8	-	5	9	-	1	6	128
Idaho	2	3	3	11	21	-	-	1	-
Wyo.	1	1	-	1	1	-	-	-	22
Colo.	62	61	3	27	72	5	3	-	5
N. Mex.	25	31	-	50	54	1	1	-	4
Ariz.	99	172	5	126	139	-	1	-	25
Utah	11	15	8	-	6	-	-	-	3
Nev.	177	70	-	28	14	-	-	-	-
PACIFIC	3,772	3,898	17	2,104	2,296	4	76	2	211
Wash.	96	76	2	122	136	-	5	-	-
Oreg.	157	135	1	78	80	-	6	1	-
Calif.	3,488	3,675	14	1,789	1,952	2	64	1	203
Alaska	6	3	-	26	32	2	-	-	8
Hawaii	21	9	-	89	116	-	3	-	-
Guam	3	2	-	8	25	-	-	-	-
P.R.	340	543	-	105	167	-	4	-	36
V.I.	1	3	-	4	2	-	-	-	-
Amer. Samoa	-	-	-	3	2	-	1	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending July 16, 1988 (28th Week)

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	>65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	655	434	150	45	10	16	47
Boston, Mass.	169	95	46	14	4	10	15
Bridgeport, Conn.	39	29	9	1	-	-	4
Cambridge, Mass.	27	20	6	1	-	-	2
Fall River, Mass.	22	15	5	2	-	-	-
Hartford, Conn.	51	26	17	5	3	-	1
Lowell, Mass.	41	32	6	3	-	-	5
Lynn, Mass.	13	12	-	1	-	-	-
New Bedford, Mass.	28	23	3	-	-	2	-
New Haven, Conn.	50	31	14	4	-	1	2
Providence, R.I.	49	34	12	3	-	-	1
Somerville, Mass.	7	7	-	-	-	-	1
Springfield, Mass.	48	28	13	5	-	2	4
Waterbury, Conn.	35	23	8	2	2	-	3
Worcester, Mass.	76	59	11	4	1	1	9
MID. ATLANTIC	2,949	1,936	548	308	86	71	150
Albany, N.Y.	61	40	11	5	1	4	1
Allentown, Pa.	15	13	1	1	-	-	-
Buffalo, N.Y.	113	79	24	5	4	1	20
Camden, N.J.	46	29	10	5	-	2	2
Elizabeth, N.J.	23	17	6	-	-	-	2
Erie, Pa.†	45	34	7	1	3	-	1
Jersey City, N.J.	74	46	12	11	1	4	4
N.Y. City, N.Y.	1,463	928	270	189	50	26	69
Newark, N.J.	96	41	20	15	3	7	1
Paterson, N.J.	36	19	5	5	1	6	2
Philadelphia, Pa.	491	319	101	43	9	19	15
Pittsburgh, Pa.†	72	48	17	4	2	1	4
Reading, Pa.	27	23	3	1	-	-	3
Rochester, N.Y.	150	117	18	8	7	-	20
Schenectady, N.Y.	29	24	2	2	1	-	-
Scranton, Pa.†	28	23	4	1	-	-	3
Syracuse, N.Y.	94	66	18	6	3	1	6
Trenton, N.J.	43	31	8	4	-	-	3
Utica, N.Y.	32	23	8	1	-	-	1
Yonkers, N.Y.	21	16	3	1	1	-	3
E.N. CENTRAL	2,433	1,580	532	170	76	75	80
Akron, Ohio	59	37	13	5	3	1	3
Canton, Ohio	30	24	3	1	2	-	3
Chicago, Ill.§	564	362	125	45	10	22	16
Cincinnati, Ohio	136	91	32	5	5	3	12
Cleveland, Ohio	169	109	35	10	6	9	4
Columbus, Ohio	166	95	50	13	7	1	2
Dayton, Ohio	124	87	22	9	3	3	3
Detroit, Mich.	294	173	63	33	13	12	8
Evansville, Ind.	40	27	9	-	3	1	1
Fort Wayne, Ind.	69	44	14	7	4	-	1
Gary, Ind.	16	10	3	2	1	-	1
Grand Rapids, Mich.	69	51	7	4	4	3	4
Indianapolis, Ind.	176	101	49	17	6	5	-
Madison, Wis.	31	21	5	3	1	1	1
Milwaukee, Wis.	164	121	31	5	2	5	2
Peoria, Ill.	60	45	9	2	2	2	2
Rockford, Ill.	43	30	12	-	1	-	2
South Bend, Ind.	35	21	9	2	1	2	2
Toledo, Ohio	141	97	34	5	-	5	12
Youngstown, Ohio	45	34	7	2	2	-	1
W.N. CENTRAL	816	560	167	41	30	18	24
Des Moines, Iowa	89	68	17	2	2	-	2
Duluth, Minn.	21	18	2	-	-	1	1
Kansas City, Kans.	27	15	9	1	2	-	-
Kansas City, Mo.	135	82	33	8	8	4	5
Lincoln, Nebr.	37	28	7	1	1	-	3
Minneapolis, Minn.	131	94	21	6	4	6	4
Omaha, Nebr.	92	63	21	5	3	-	3
St. Louis, Mo.	160	100	37	11	6	6	-
St. Paul, Minn.	52	39	6	5	2	-	3
Wichita, Kans.§	72	53	14	2	2	1	3
S. ATLANTIC	1,154	716	233	111	37	40	50
Atlanta, Ga.	147	96	28	16	6	1	-
Baltimore, Md.	106	76	10	2	2	-	7
Charlotte, N.C.	61	37	14	5	2	3	6
Jacksonville, Fla.	111	61	31	16	2	1	3
Miami, Fla.	134	85	27	12	4	6	-
Norfolk, Va.	57	33	11	11	1	1	3
Richmond, Va.	90	56	22	6	2	4	10
Savannah, Ga.	41	31	7	1	2	-	3
St. Petersburg, Fla.	97	70	14	7	5	1	3
Tampa, Fla.	87	49	21	8	-	8	6
Washington, D.C.	197	106	42	25	9	15	6
Wilmington, Del.	26	16	6	2	2	-	3
E.S. CENTRAL	787	500	163	55	28	41	51
Birmingham, Ala.	111	74	19	11	2	5	2
Chattanooga, Tenn.	69	50	12	4	2	1	4
Knoxville, Tenn.	70	45	16	3	4	2	8
Louisville, Ky.	70	39	17	7	2	5	-
Memphis, Tenn.	190	114	35	10	9	22	19
Mobile, Ala.	79	54	19	6	-	-	4
Montgomery, Ala.	46	37	5	1	-	3	6
Nashville, Tenn.	152	87	40	13	9	3	8
W.S. CENTRAL	1,339	817	288	137	50	47	48
Austin, Tex.	64	42	12	7	*	3	2
Baton Rouge, La.	39	26	7	6	-	-	-
Corpus Christi, Tex.§	39	29	8	2	-	-	-
Dallas, Tex.	191	107	39	25	11	9	5
El Paso, Tex.	63	39	13	8	2	1	3
Fort Worth, Tex	126	77	27	13	3	5	4
Houston, Tex.§	308	176	74	34	13	11	7
Little Rock, Ark.	70	41	18	7	2	2	2
New Orleans, La.	118	72	22	14	7	3	-
San Antonio, Tex.	172	105	36	16	8	7	9
Shreveport, La.	29	18	5	2	1	3	4
Tulsa, Okla.	121	85	27	3	3	3	12
MOUNTAIN	735	461	138	73	38	25	36
Albuquerque, N. Mex.	84	52	16	8	6	2	3
Colo. Springs, Colo.	32	22	4	2	3	1	5
Denver, Colo.	147	92	26	21	5	3	7
Las Vegas, Nev.	87	47	25	12	2	1	6
Ogden, Utah	23	20	2	-	1	-	3
Phoenix, Ariz.	184	110	35	18	12	9	4
Pueblo, Colo.	20	17	2	1	-	-	3
Salt Lake City, Utah	52	26	10	5	2	9	-
Tucson, Ariz.	106	75	18	6	7	-	5
PACIFIC	1,969	1,272	384	177	68	59	103
Berkeley, Calif.	14	8	4	2	-	-	-
Fresno, Calif.	106	60	20	11	8	7	3
Glendale, Calif.§	25	21	4	-	-	-	1
Honolulu, Hawaii	80	47	23	7	-	3	6
Long Beach, Calif.	92	58	18	7	2	7	13
Los Angeles Calif.§	560	371	105	53	17	7	20
Oakland, Calif.	63	39	14	5	3	2	2
Pasadena, Calif.§	24	19	3	1	-	1	1
Portland, Oreg.	148	95	31	11	2	9	5
Sacramento, Calif.	153	106	24	13	3	5	19
San Diego, Calif.	132	78	26	15	12	3	10
San Francisco, Calif.	167	101	33	23	4	6	7
San Jose, Calif.	145	97	31	11	4	2	11
Seattle, Wash.	145	94	23	13	9	6	1
Spokane, Wash.	68	47	15	3	2	1	1
Tacoma, Wash.	47	33	10	2	2	-	3
TOTAL	12,837††	8,276	2,603	1,117	423	392	589

*Mortality data in this table are voluntarily reported from 121 cities in the United states, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

**Pneumonia and influenza.

†Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

††Total includes unknown ages.

§Data not available. Figures are estimates based on average of past available 4 weeks.

Hepatitis B — Continued

Adults in general and groups such as IV drug abusers in particular are extremely difficult to reach for delivery of vaccine. In addition, once persons begin those life-styles associated with a high risk of acquiring HB and can be identified as belonging to a high-risk group, they may become infected before vaccine can be given. Thus, the major obstacles to achieving an impact on the incidence of HBV infection in the United States are identifying and reaching persons before they become infected and vaccinating them in a timely manner. Failure to overcome these obstacles will necessitate consideration of a broader immunization strategy.

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Epidemiologic Notes and Reports

Childhood Chloroquine Poisonings — Wisconsin and Washington

Each year the approximately 1 million Americans who travel to malarious areas may be advised to take chloroquine weekly for prophylaxis (*1*). In addition, chloroquine is prescribed as therapy for certain connective tissue disorders. Consequently, there are many opportunities for children to be poisoned through chloroquine ingestion. To alert medical practitioners and the public to this danger, the following cases of chloroquine poisoning recently reported to CDC are presented.

Case 1. On August 6, 1987, a previously healthy 20-month-old girl was found unresponsive next to an opened empty bottle of chloroquine phosphate. The chloroquine remained from a supply dispensed to the child's grandfather for malaria prophylaxis. The amount of chloroquine base the child swallowed was estimated at 800 mg.

Shortly after the emergency medical technicians arrived, the child suffered cardiac arrest. Normal sinus rhythm was restored en route to the emergency room, but persistent hypotension necessitated intravenous dopamine. The child began to have generalized seizures 1 hour after ingestion; these were controlled with intravenous diazepam, phenytoin, and phenobarbital. Charcoal hemoperfusion performed 7 hours after ingestion did not improve her condition. Serum chloroquine concentrations before and after the procedure were 0.8 and 0.3 μg/mL, respectively (2.5 and 0.94 μmol/L). Over the next week her neurologic condition gradually improved, and mechanical ventilation was discontinued after the eighth day of hospitalization. Subsequent cranial computerized tomography scans and electroencephalography revealed atrophy and decreased voltage consistent with postanoxic encephalopathy.

Poisonings — Continued

Rehabilitative efforts continue; currently, she is able to make some purposeful movements but still requires feeding by gastrostomy.

Case 2. On January 20, 1988, a 17-month-old boy ingested 2.4 g of chloroquine base. His parents had recently returned from a tour of duty in Cameroon during which they had been taking chloroquine for malaria prophylaxis; the chloroquine had been dispensed in Cameroon in an envelope. The child was immediately taken to an emergency room, but 30 minutes after ingestion, ventricular tachycardia, hypotension, apnea, and seizures developed. After 2 hours of resuscitation, his condition was stabilized on intravenous epinephrine and diazepam. Serum chloroquine concentration 11 hours after ingestion was 1.0 μg/mL (3.1 μmol/L). His condition improved slightly during the next 3 weeks, and he was gradually removed from ventilator support after 1 month. However, he remains unconscious with no purposeful movement.

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Editorial Note: When used for prophylaxis and treatment of malaria, chloroquine has proven to be safe in the recommended dosage range (5–25 mg/kg body weight). However, a relatively small increase in the therapeutic dose is toxic; children who have ingested 2–3 times the recommended treatment dose have been fatally poisoned (*2*). Chloroquine is rapidly absorbed from the gastrointestinal tract. Consequently, as the second case illustrates, the interval between ingestion and cardiorespiratory collapse is frequently less than 2 hours (*3,4*).

A recent review of 91 cases of chloroquine poisoning in which blood concentrations were determined revealed that no patient survived in whom blood concentrations were greater than 25 μmol/L (*5*). Since the drug is extensively tissue-bound, concentrations in the liver and kidney are generally many times higher than those in the blood (*6*). The extensive tissue binding makes dialysis largely ineffective in removing the drug (*7*).

The toxic effects of chloroquine are related to its depressant effect on the myocardium, resulting in decreased cardiac output and hypotension. Like quinidine, the drug reduces the excitability and conductivity of cardiac muscle, and at toxic concentrations profound bradycardia with ventricular escape rhythms may occur (*8*).

Animal toxicology data and case studies of suicide attempts with chloroquine suggest that sympathomimetic agents may decrease the hemodynamic and electrophysiologic cardiotoxic effects of chloroquine (*8*). Diazepam has been found to decrease the mortality rate in experimental chloroquine poisoning in rats (*9*). A recent study examined the clinical utility of immediately administering intravenous diazepam and epinephrine in chloroquine poisoning. Ten of eleven patients who ingested more than 5 g of chloroquine and were treated with diazepam and epinephrine survived, as compared with 1 of 51 retrospective controls who ingested comparable dosages (*5*).

Health-care providers should be aware of the potential interventions to prevent chloroquine poisoning. Chloroquine prescriptions should be written for the precise amount needed for prophylaxis for each trip to avoid accumulation of extra tablets. Any drug remaining after prophylaxis is complete should be safely discarded. Chloroquine should be dispensed in child-proof containers, particularly when young children are in the home.

Poisonings – Continued

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Notice to Readers

Announcement of the Third National Conference on Chronic Disease Prevention and Control

CDC and the Association of State and Territorial Health Officials will cosponsor the Third National Conference on Chronic Disease Prevention and Control, titled "Putting Science Into Practice," October 19–21, 1988, at the Hyatt Regency Denver, in Denver, Colorado. The conference is open to the public, and there will be no registration fee.

The conference will build on the strategies identified by participants at the First and Second National Conferences on Chronic Disease Prevention and Control. Those two conferences placed particular emphasis on the interactions among federal, state, and local health departments; voluntary health agencies; professional organizations; and others.

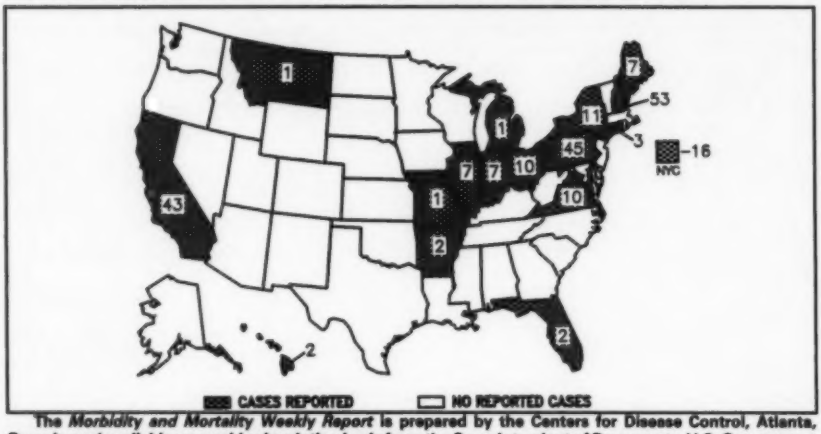
This year's conference will include the following plenary sessions:

- Health Education/Mass Media Approaches for Changing Behaviors
- Preventive Health Services in Primary Care Settings (including the cost-effectiveness of chronic disease prevention and control strategies)
- Long-Term/Broad Strategic Issues for Public Health Chronic Disease Control

Concurrent afternoon sessions will focus on breast cancer, cervical cancer, cholesterol/cardiovascular disease, diabetes, and smoking. In addition, the disproportionate burden of chronic diseases on minority and other underserved populations, a topic highlighted in last year's conference, will be covered as a part of the mainstream of this year's conference.

Additional information may be obtained by contacting Martha S. Brocato, Division of Chronic Disease Control, Center for Environmental Health and Injury Control, Centers for Disease Control (F10), Atlanta, Georgia 30333; telephone: (404) 488-4251 or FTS 236-4251.

FIGURE I. Reported measles cases — United States, Weeks 24–27, 1988



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The data in this report are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the succeeding Friday. The editor welcomes accounts of interesting cases, outbreaks, environmental hazards, or other public health problems of current interest to health officials. Such reports and any other matters pertaining to editorial or other textual considerations should be addressed to: Editor, *Morbidity and Mortality Weekly Report*, Centers for Disease Control, Atlanta, Georgia 30333.

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